



# UNITED STATES PATENT AND TRADEMARK OFFICE

*Esh*

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/910,537	07/20/2001	Jason S. Reid	P21-US	2129
26148	7590	05/04/2005		EXAMINER
REFLECTIVITY, INC. 350 POTRERO AVENUE SUNNYVALE, CA 94085			DUONG, KHANH B	
			ART UNIT	PAPER NUMBER
			2822	

DATE MAILED: 05/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/910,537	REID, JASON S.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Khanh B. Duong	2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 17 February 2005.  
 2a) This action is **FINAL**.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1,3-24,55-66 and 71-83 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) 1,3-10,12-23,71-74 and 77-82 is/are allowed.  
 6) Claim(s) 24,55-58,63-66,75,76 and 83 is/are rejected.  
 7) Claim(s) 11 and 60-62 is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                    | Paper No(s)/Mail Date. _____.   |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____. | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|   | 6) <input type="checkbox"/> Other: _____.                                   |

## **DETAILED ACTION**

### ***Response to Amendment***

This office action is in response to the amendment filed February 17, 2005.

Accordingly, claim 2 was cancelled, claims 1, 24, 55, 64, 71, 73, 75, 77 and 79 were amended, and new claims 82 and 83 were added.

Currently, claims 1, 3-24, 55-66 and 71-83 are pending in this application.

### ***Response to Arguments***

Applicant's arguments with respect to the pending claims have been considered but are moot in view of the new ground(s) of rejection under Linder et al. [“Ternary Ta-Si-N Films for Sensors and Actuators”, Sensors and Actuators, Vol. A61 (1997), pp. 387-391] in view of Gasser et al. [“Reactively Sputtered Ru-Si-O Films”, Journal of Applied Physics, Vol. 86, No. 4 (August 15, 1999)], submitted by applicants in IDS dated March 4, 2003.

The indicated allowability of claims 55-58 and 63 is withdrawn in view of the reference(s) to Linder and Gasser. Rejections based on the cited reference(s) follows.

### ***Claim Objections***

**Claims 3, 11, 12, 56, 57, 62, 63, 76, 78 and 83 are objected to because of the following informalities:**

Claim 3 improperly depends on claim 2, a cancelled claim.

Claim 11 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the

Art Unit: 2822

claim(s) in independent form. In this case, “at least a flexible portion comprises the nitride compound and the late transition metal” is also recited in claim 1.

Claim 12, line 1, “a movable element” should be --the movable element--.

Claim 56 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. In this case, the late transition metal can only be selected from the noble metals of groups 8B or 1B or the periodic table.

Claim 57 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. In this case, “an element from groups 3A to 6A” is also recited in claim 55.

Claim 62, is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. In this case, the late transition metal can only be a noble metal as recited in claim 55.

Claim 63 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the

claim(s) in independent form. In this case, "the late transition metal is a noble metal" is also recited in claim 55.

Claims 76 and 78, line 2, "a movable portion" should be --the movable portion--.

Claim 83, line 4, after "wherein the", "moveable" should be --movable-- for constancy.

Appropriate correction is required.

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 83 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 83 recites the limitation "the flexible portion" in line 6. There is insufficient antecedent basis for this limitation in the claim.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**Claims 24, 55-59, 63-66, 75 and 76 are rejected under 35 U.S.C. 103(a) as being unpatentable over Linder et al. [“Ternary Ta-Si-N Films for Sensors and Actuators”, Sensors and Actuators, Vol. A61 (1997), pp. 387-391] in view of Gasser et al. [“Reactively Sputtered Ru-Si-O Films”, Journal of Applied Physics, Vol. 86, No. 4 (August 15, 1999)].**

Linder et al. (“Linder”) expressly discloses in Fig. 3 a micromechanical device comprising: a movable portion (cantilever) and a flexible hinge portion that comprises Ta-Si-N, wherein Ta-Si-N comprises a ceramic compound (Si-N) and an early transition metal, wherein the ceramic compound and the early transition metal are a ternary system within a common layer [see page 380, Introduction, 2<sup>nd</sup> paragraph, and page 390, left column, 2<sup>nd</sup> paragraph].

Re claims 24, 55-58, 63-66 and 75, Linder discloses using a ceramic compound (Si-N) and an early transition metal (Ta), instead of a ceramic compound and late transition metal.

Gasser et al. (“Gasser”) teaches the use of Ru-Si-O alloy films in micromechanical devices, wherein Ru-Si-O comprises a ceramic compound (oxide: Si-O) and a late transition

Art Unit: 2822

metal (Ru) [see INTRODUCTION, page 1974, 1<sup>st</sup> paragraph]. Note that Ru is a noble metal, and Si-O comprises two elements (Si and O) from the first two rows of groups 3A to 6A.

Gasser further teaches Ru-Si-O films display “great similarities with Ti-Si-N films” and that if “the success of Ti-Si-N and its related ternary alloys is an indication, one could anticipate an equivalently promising development for Ru-Si-O type alloys and their applications” [see CONCLUSION AND OUTLOOK, page 1980, 1<sup>st</sup> and 3<sup>rd</sup> paragraphs]. Thus, Gasser is shown to suggest Ti-Si-N alloy films (TM-Si-N) and Ru-Si-O alloy films (TM-Si-O) are equivalent materials known in the art for forming MEMS.

Since Linder and Gasser are both from the same field of semiconductor device, the purpose disclosed by Gasser would have been recognized in the pertinent prior art of Linder.

Therefore, because TM-Si-N and TM-Si-O were art-recognized equivalent materials as demonstrated by Gasser at the time the invention was made, one of ordinary skill in the art would have found it obvious to substitute one material for the other.

Re further claim 76, since Linder discloses the micromechanical device comprising actuators [see page 380, Introduction, 2<sup>nd</sup> paragraph], it must be inherent that the hinge is operable to be actuated by an electrostatic force derived from an electrostatic force derived from an electrostatic field established between the movable portion and an electrode.

*Allowable Subject Matter*

Claims 1, 3-10, 12-23, 71-74 and 77-82 are allowed.

Claims 60 and 61 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 83 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

Claims 11 and 62 would be allowable if rewritten or amended to overcome the objections set forth in this Office action.

The following is a statement of reasons for the indication of allowable subject matter: none of the prior art of record, taken alone or in combination, fairly shows or suggests all the combined limitations as claimed.

Re claim 1, none of the prior art of record fairly shows or suggests a micromechanical device comprising: a movable portion and a flexible portion, the flexible portion comprising a nitride compound and a late transition metal, wherein the nitride compound and late transition metal are in the same film or layer and wherein the film or layer is a ternary or higher system; wherein the nitride compound is a nitride of silicon, boron or aluminum.

Re claim 71, none of the prior art of record fairly shows or suggests a micromechanical device comprising: a flexible hinge comprising a nitride compound and a late transition metal, wherein the nitride compound and late transition metal are in the same film or layer and wherein the film or layer is a ternary or higher system deposited by chemical or physical vapor deposition, wherein the nitride compound is a nitride of silicon, boron or aluminum.

Re claim 73, none of the prior art of record fairly shows or suggests a micromechanical device comprising: a movable portion and a flexible hinge to which the movable portion is attached such that the movable portion is operable to move, wherein the flexible hinge comprise a ceramic compound and a late transition metal, wherein the ceramic compound and late transition metal are in the same film or layer and wherein the film or layer is a ternary or higher

Art Unit: 2822

system deposited by chemical or physical vapor deposition, wherein the ceramic compound is a nitride compound that is a nitride of silicon, boron or aluminum.

Re claim 77, none of the prior art of record fairly shows or suggests a micromechanical device comprising: a movable portion and a flexible hinge to which the movable portion is attached such that the movable portion is operable to move, and wherein the flexible hinge comprises a ceramic compound and a late transition metal, wherein the ceramic compound and late transition metal are a ternary or higher system within a common layer, wherein the ceramic compound is a nitride compound which is a nitride of silicon, boron or aluminum.

Re claim 79, none of the prior art of record fairly shows or suggests a micromechanical device comprising: a flexible portion comprising a nitride compound having an element from groups 3A to 6A of the periodic table and a late transition metal, wherein the nitride compound and late transition metal are in the same film or layer and wherein the film or layer is a ternary or higher system deposited by chemical or physical vapor deposition, wherein the late transition metal is a noble metal.

Re claim 82, none of the prior art of record fairly shows or suggests a micromechanical device comprising: a movable portion and a flexible portion, the flexible portion comprising a nitride compound and a late transition metal, wherein the nitride compound and late transition metal are in the same film or layer and wherein the film or layer is a ternary or higher system; and wherein the late transition metal is noble metal.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khanh Duong whose telephone number is (571) 272-1836. The examiner can normally be reached on Monday - Thursday (9:00 AM - 6:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



KBD



AMIR ZARABIAN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800